CLAIMS

What is claimed is:

1. An algebraic codebook method for distributions of $P$ signed pulses on $N$ positions, comprising:

(a) indexing all distributions of $P$ signed pulses on $N$ positions by ordering said distributions in terms of numbers of distributions of $Q$ pulses on $M$ positions for $Q$ less than $P$, $M$ less than or equal to $N$, and without regard to the sign of any pulses at the $M$th position, where $P$, $N$, $Q$, and $M$ are non-negative integers.

2. The method of claim 1 wherein:

(a) each of said $N$ positions containing at least one of said $P$ pulses corresponds to said numbers of distributions of $Q$ pulses on $M$ positions for a single value of $Q$.

3. An algebraic codebook method for distributions of $P$ signed pulses on $N$ positions, comprising:

(a) computing a codebook index for a distribution of $P$ signed pulses on $N$ positions by summing a pulse index for each non-overlapping pulse with each said pulse index a sum of terms $XK(M,Q)$ where $X$ is a multiplier equal to 0, 1, or 2 and $K(M,Q)$ is the numbers of distributions of $Q$ signed pulses on $M$ positions without regard to the sign of any pulses at the $M$th position, where $P$, $N$, $Q$, and $M$ are non-negative integers.

4. An algebraic codebook method for distributions of $P$ signed pulses on $N$ positions, comprising:

(a) providing a codebook index $I_{CB}$ where $I_{CB}$ is a sum of one or more pulse indexes with each pulse index corresponding to a position occupied by one or more pulses of a distribution of $P$ signed pulses on $N$ positions, wherein each pulse index is a sum with respect to $M$ of one or more terms $XK(M,Q)$ where $X$ is

a multiplier equal to 0, 1, or 2 and $K(M,Q)$ is the number of distributions of $Q$ signed pulses on $M$ positions without regard to the sign of any pulses at the $M$th position, and wherein $P$, $N$, $Q$, and $M$ are non-negative integers;

(b) computing a distribution of $P$ signed pulses on $N$ positions from said codebook index $I_{CB}$ by successively extracting each of said pulse indexes from $I_{CB}$ where a pulse index is computed by accumulating $XK(M,Q)$ for $M$ decreasing from a location determined by the extraction of the immediately prior pulse index, said accumulating continuing until equaling or exceeding $I_{CB}$ minus the prior extracted pulse indexes.